

**CALIFORNIA
MICROWAVE**

**MICROWAVE
DATA
SYSTEMS**

175 Science Parkway
Rochester, New York 14620-4261
Tel: (716) 242-9600
Fax: (716) 242-9620

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6 March 1996

Office of the Secretary
Mr. William F. Caton, Acting Secretary
Federal Communications Commission
1919 M Street N.W., Room 222
Washington DC 20554

Re: FCC 96-36
ET Docket 96-8

DOCKET FILE COPY ORIGINAL

Dear Mr. Caton:

Please find enclosed one original and five copies of Microwave Data Systems' Reply Comments to the Notice of Proposed Rule Making.

Should any questions arise concerning this Reply, please communicate directly with the undersigned.

Very truly yours,


Donald J. Arndt

Director of Marketing and Product Development

cc: George Arena, President, MDS

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Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of

Amendment of Part 15 of the Rules
with regard to the operation of
spread spectrum transmitters
with directional antennas

To: The Commission

Comments of
Microwave Data Systems
a division of
California Microwave, Inc.
in Reply to the
Notice of Proposed Rule Making

California Microwave, Inc. ("CMI") and Microwave Data Systems ("MDS"), pursuant to Sections 1.415 and 1.419 of the Commission's Rules, hereby submits this reply to the request for comments in the subject Docket.

Introduction

On February 5, 1996 the Commission issued a NPRM inviting comments.

Comments of Microwave Data Systems

Antenna Gain

CMI and MDS are manufacturers and suppliers of both 915 MHz (frequency hopping) and 2450 MHz (both frequency hopping and direct sequence) transceivers. Our products are manufactured and sold for use in fixed applications. We believe that fixed or semi-fixed (backpack surveying, managing ship loading in a harbor, etc.) are applications of merit for spread spectrum technology *not* mobile uses where there is a proliferation of moving omni-directional antennas. The MDS 915 MHz product has been in production for over 2 years and over 5,000 radios have been deployed in a wide variety of fixed applications for public utilities and the transportation industry. A very large 915 MHz system is in operation near New York City and throughout Long Island. The only viable option the customer had, due to the lack of available licensed

frequencies, was to consider unlicensed spread spectrum. As of the writing of this response, no interference has been detected or known to have been caused by this product within this or any other application of MDS' in or near a metropolitan area.

It is our belief that permitting higher antenna gain at a limited set power is the best use of the band for fixed applications. A calculation of the average signal strength over a given geographic area, say 10 by 10 miles, would show that high gain (narrow beam pattern) antennas, while being stronger in one direction, on the average result in less signal strength and potential interference to other operations. Additionally, by encouraging the use of highly directional antennas (for fixed systems), the probability of being interfered with is less since the receive antenna is more selective.

In other words, a high gain antenna will produce higher power density in one direction as it will produce lower power densities in all other directions, thus minimizing the probability of interference to and from other stations. If excess power density is a problem, the transmit power can always be reduced. A gain restriction is justified for transmitters using omnidirectional antennas, but not for fixed point-to-point applications using highly directionalized antennas. Additionally, if the radio has the ability to set its output power not to exceed FCC Rules based on the antenna manufacturer's published/tested gain; the radio should not have to be authorized under the certification procedure by submitting the radio with each antenna that might be used with it in a system (such as a reuse of an existing antenna of known gain). By this method, the Commission can confirm the proper operation of a radio in an interference dispute.

CMI/MDS does not support the Commission in its direction in regards to antenna gain versus power with fixed point-to-point systems in the Part 15 bands. We encourage the Commission to set the Rules to use limited power to maintain a sufficient path margin for the application at a limited line of site distance and encourage the use of *only* highly directional narrow beam antennas to *minimize* interference in these types of applications. Not to eliminate the 6 dBi limit, but to allow higher limits based on a set of workable rules. The same logic should apply in the 2.45 GHz band as proposed in the 5.8 GHz band. The Commission can rule that fixed applications be allowed to use a higher dB level as opposed to other uses as precedent in the interference Rules for 915 MHz which are mandated to be tested and coordinated between shared users.

Hopping Channels

We support the Commission's direction to reduce, from 50 to 25, the minimum number of channels required for frequency hopping spread spectrum systems operating in the 915 MHz band.

This proposed rule is favored in order to provide the ability to frequency hop in a way to minimize interference from (or to) the shared users in this band such as the LMS providers. As LMS providers proliferate, manufacturers of frequency hopping radios should have the ability to offer their customers as much protection from (and minimize any interference to) these primary users and yet provide a high level of (>95%) throughput.

MDS supports the reduction in power principle when using fewer hopping channels.

Harmful Signal Levels

MDS supports the Commission in regards to notification in the product documentation, installation procedures and at or near the antenna to warn of the potential of RF radiation. In the case of fixed, directional antennas mounted above ten feet; a conspicuous printed warning in the product documentation should provide the necessary assurances.

Measurement of Processing Gain and Limits on Unwanted Emissions

MDS supports the proposed Commission directions to test processing gain based on the ratio of the chipping (spreading) rate to data rate for the system. Also an alternative method of measuring the processing gain by using the CW jamming margin method is acceptable.

MDS is also in support of the measurement method outlined in section 42 of the NPRM.

Section 15.204(d)

MDS is opposed to the Commission in its wording in this section as it deals with external, possibly customer-installed antennas.

Our 2.4 GHz radio is designed to the latest FCC Part 15 Rules. As an example, the transmit power is set via the software port using the manufacturer's published gain for the antenna that is to be used with the radio. This password-protected feature allows either end of the path to use a different antenna (new or existing) and meet the power/gain issues outlined in the current Rules. The software assumes that the antenna has a least a 20 dB gain and uses this value as the minimum allowed setting.

With this type of built-in operation, we believe this provides flexibility for the customer to properly configure the radio for legal transmitted power without the need to burden the FCC repeatedly to have the radio approved with the many different antennas that it might be used.

Summary

MDS is in support of most of the proposed changes outlined in the subject NPRM. We encourage the Commission to continue to provide Rules which allow shared use, but not abusive use of these precious, and in the future very crowded, Part 15 bands.

In many areas, where they are needed most, no Part 94 point-multipoint 900 MHz licensed frequencies are available for use by the utilities that serve the public. Until the 932/941 MHz point-multipoint frequencies are available for use by utilities, these public service companies will need to find other alternatives such as Part 15 spread spectrum radios. The FCC has had applications on file for over three years with no action to grant the much needed frequencies. Your actions are causing frustrated public utilities to use unlicensed frequencies to get their systems communicating. The impact of not having available licensed frequencies is causing an unnecessary quagmire of shared usage.

Respectfully submitted,

← Microwave Data Systems, a Division of California Microwave



Donald Arndt

Director of Marketing and Product Development